DOCUMENT RESUME

ED 093 374 IR 000 869

AUTHOR Milstein, Barney M.
TITLE Word Order Drills With Coursewriter.
PUB DATE Aug 74
NOTE 16p.; Paper presented at the Association for the Development of Computer-Based Instructional Systems Summer Meeting (Bellingham, Washington, August 12-14, 1974)

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS *Computer Programs; *German; Language Instruction; *Sentence Structure; *Word Lists
IDENTIFIERS *Coursewriter; Drill and Practice

ABSTRACT

Drills in German word order were developed by use of random generation of sentences coupled with the Ohio State edit function. Differences between English and German word orders are a cause of interference in the learning of German structural patterns. German word order may be manipulated in some situations and must be in others. Although the Coursewriter programing language can match word order by means of the word modifier, the number of different verb and person combinations which can be monitored is limited. However, combining the generation of meaningful drill sentences from pools of sentence elements allows not only effective monitoring of many possible combinations, but diagnosis of errors as well. The edit function is applied in turn to lines consisting of these elements; as an element is matched a number is substituted for it in the student buffer. A correct or incorrect answer is then matched as a number. (Author/WH)

ED 093374

NAME: Barney M. Milstein
TITLE: Assoc. Prof. of Literature
INSTITUTION: Stockton State College
ADDRESS: Pomona, NJ 08240
PHONE: 609-646-7474 x250

BEST COPY AVAILABLE

--ABSTRACT--

WORD ORDER DRILLS WITH COURSEWRITER

The paper discusses drills in German word order by use of random generation of sentences coupled with the Ohio State edit function.

Differences between English and German word order are a cause of interference in the learning of German structural patterns. German word order may be manipulated in some situations and must be in others. For example, German allows the optional inversion: S - V - O to O - V - S , but questions must go from S - V - O to V - S - O if they do not start with interrogatives. Compound sentences also present complicated difficulties to the learner.

Although Coursewriter can match word order by means of the word modifier, the number of different verb and person combinations which can be monitored is limited, especially if one wishes the student to type out the entire verb correctly. However, combining the generation of meaningful drill sentences from pools of sentence elements with the use of an edit function developed at Ohio State University allows not only effective monitoring of many possible combinations, but diagnosis of errors as well.

Sentences are produced for the student from a pool of elements containing all eight persons, eight verbs, an indefinite and a definite article, and eight direct objects. The edit function is applied in turn to lines consisting of these elements; as an element is matched a number is substituted for it in the student buffer. A correct or incorrect answer is then matched as a number. In addition to this use, the edit function also works well in a program matching drills on German two-way prepositions.

IR 000 869

ED 093374

BEST COPY AVAILABLE

WORD ORDER DRILLS WITH COURSEWRITER

Barney M. Milstein
Stockton State College
August 1974

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

IR 000 869

Introduction

The following paper deals with the construction of a Coursewriter program to drill word order problems in German. The use of an Ohio State University edit function allows the author to monitor the structures of a relatively large number of drill sentences without sacrificing diagnostic feedback to the student. The program is called GER4. The paper consists of three parts: a statement of the problem and paedagogical goals; a description of the operation of the program; a technical discussion of some programming points.

I

The Problem

In some natural languages, notably English and German, word order is of particular grammatical importance. English word order, for instance, is relatively rigid, a price paid for the shedding of inflections several centuries ago. German, on the other hand, a language with considerably more inflection, has certain fixed patterns of word order, but takes advantage of its inflectional capacity to allow greater movement of units within the sentence structure. Some of the movements are optional, and are frequently used to change emphasis, but others are obligatory and grammatical. Some similarities between the surface structures of the two languages afford the beginning learner of German a great deal of security and help in learning structures. However, some differences can be a cause of interference for the learner, and consequently patterns must be drilled to reinforce the learning process.

The basic structure of a declaratory utterance in both English and German is the same:

SUBJECT - VERB - OBJECT

Uncle George buys the car

Onkel Georg kauft den Wagen

Such a structural transference presents no problem at all for the English-speaking learner of German. However, German also allows the following inversion--used for emphasis:

OBJECT -VERB -SUBJECT

Den Wagen kauft Onkel Georg

The fundamental structural feature of the simple declaratory sentence in German is that it must have the verb in its second position. Ambiguity is avoided in one of two ways: semantically, since it is highly unlikely that Uncle George will be purchased by a car; or through the possible use of an inflection, in this case the accusative ending forming the article 'den.' Although the learner of German is often puzzled for a bit when hearing or reading such usages, the bewilderment does not usually last long. Making such inversions a part of the active linguistic repertoire, however, requires some practice.

A more serious divergence of the structures of both languages exists in the treatment of questions. Interrogatives are handled two ways in both languages, but only one is common to both. The structure:

INT -VERB -SUBJECT -OBJECT

is valid for both languages only inasmuch as both begin with the interrogative:

Warum hat er kein Geld?

Why doesn't he have money?

But even with these structures, considerable trouble can arise, since English uses the verb 'do' as an auxiliary. This fact is primarily responsible for interference in this and the other interrogative structure in German, which is created simply by putting the verb in the first position. Such usage does exist in English but it is restricted to a limited number of verbs. One says:

Hat er das Geld?

Has he the money?

But no one says:"Reads he the newspaper?" Thus the native speaker of English must learn the verb-first construction by drilling.

Unfortunately, most sentences in either English or German do not fall into such simple categories as these. Sentences have indeed been known to have somewhat more than just a S-V-O structure, some even containing adjectives, adverbs and other pitfalls in the learning of a language. Indeed, time elements brought into a German sentence open up entirely new vistas of learning problems. English does, of course, allow some mobility for such units:

I will get it for you tomorrow

and

Tomorrow I will get it for you

and

I will get it tomorrow for you

are all allowable, even the third example. However, the German convention that the verb must fill the second position, plus a looser convention that puts a time element after the verb as close to it as possible can make life complicated for language learners, Thus:

Ich kaufe morgen den Wagen

S V ADV O

(I buy the car tomorrow)

allows two transformations:

Morgen kaufe ich den Wagen
Den Wagen kaufe ich morgen.

A question, however, can still only have the verb in the first position:

Kaufe ich morgen den Wagen?

Both of these contrasting structures offer good material for pattern practice at the beginning level.

The last set of problems with which this paper deals is perhaps the most baffling to English speakers, having long since achieved immortality in the writings of Mark Twain:compound sentences. Sentences having coordinate clauses in German, those separated by 'and, but, for, or '(among others), and being able to stand independently, behave much as they do in English, and do not present much problem in the learning process.However, in dealing with subordinate clause sentences, in which one of the clauses is so linked to the other that it cannot stand alone, German can make life difficult for the native speaker of English. This is the infamous case in which the verb goes to the end of the clause. Consider the following:

We didn't go to the movies because we didn't have money.

Because we didn't have money we didn't go to the movies

In both of these the word order of each clause has remained the same, even though one of the clauses ('because') cannot stand as a complete thought by itself. Thus the word order in English S-V-O -CO -S-V-O ('CO' = 'connective'), can easily be transformed into CO-S-V-O-S-V-O. German, however does things differently. In such a sentence it sets both clauses apart by a comma, --the comma, in effect, becomes grammatical--and the inflected verb of the subordinate clause goes to the end of the clause.

Wir gingen nicht ins Kino, weil wir kein Geld hatten.

S V PP CO S O V

(We didn't go to the movies, because we didn't have money)

A further difficulty arises if one wishes to put the subordinate clause first, as both English and German are

wont to do. The comma is still maintained, and the verb in the subordinate clause goes dutifully to the end, but now the verb in the main clause precedes its subject In effect it is still acting as the 'second' element in a larger sentence, with the subordinate clause itself acting as the first element:

Weil wir kein Geld hatten, gingen wir nicht ins Kino.

CO S O V V S PP

The task of learning these structures is a difficult one:not only must structural interference be overcome, but two separate thoughts must be linked as well.

Since rote learning does in fact play a large role in the intial mastery of these structures, the computer can be made to take up some of the task of drilling.

II

The Program

The problems dealt with in this paper are of particular interest because they offer the student practice in purely structural work, rather than in morphological patterns. Thus, the requirement that a pattern drill drill only one thing at a time is fulfilled inasmuch as the 'thing' is the structure of the sentence itself.

A difficulty arising in the use of drills is the necessity to vary the material. Ideally each drill would be a unique example of the pattern being practiced. Indeed, some textbooks do this. Programming such drills into a computer, while in principle not difficult, inevitably would require a large outlay of time for the author.Anticipation of errors, an advantage of Coursewriter, can become a headache even where morphological considerations are not primary, as in the present case.

For the beginning to intermediate levels of language learning-and English as a Second Language is certainly to be included in this category--it might be better to work with a relatively small pool of semantically compatible words from which meaningful sentences can be generated at random. Such pools can be built around specific problem areas.

The program under discussion generates sentences at random from the following pool of German words:

```
PERSONS----------ich du sie er wir ihr
NAME-------------Josef
VERBS------------holen kaufen verkaufen sehen
                 haben finden betrachten bekommen
ARTICLES---------den die das einen eine ein
OBJECTS----------Ball Wagen Stuhl Tisch
                 Zeitung Landkarte Kamera Katze
                 Buch Auto Bier Kleid
ADVERBS----------heute morgen jetzt immer
RELATIVES--------Onkel Tante Vetter
NAMES------------Wilhelm Georg Hermann Hans
                 Franz Klaus Willi Alwin
                 Klara Toni Anna Maria
CONJUNCTIONS-----dass wie warum
VERBS------------sagen hoeren wissen erzaehlen
NEGATOR----------nicht
```

The second set of verbs is used for the independent clause in exercises drilling multiple-clause sentences. Thus, they may begin:'Onkel Hermann sagt, dass...' ('Uncle Herman says that...'). Although after a time some of the se sentences will have a familiar ring to the student, the number of allowable combinations arising from this relatively small base of words is certainly enough for intial pattern practice. Admittedly, some of the sentences do approach the limits of seriousness, such as:

Tante Toni betrachtet eine Katze

(Aunt Toni looks at a cat)

but, nonetheless, they do not violate semantic possibility.

The material is at present given to the student at three levels: simple sentence inversions and interrogatives, sentences with time elements added and multiple clause sentences. At all three levels students have a choice of working with 'inverted' word order, interrogative word order or a random mixture of both. At the third level the students are presented with two sentences and a subordinate connective. They must then type in a correct compound sentence. In all cases the attempt is made to anticipate errors and provide the student with appropriate feedback.

At the first level the student is presented with a simple sentence such as the following:

Tante Toni kauft das Auto

The anticipated correct answer is:

Das Auto kauft Tante Toni

If the student types the correct answer, he is rewarded with an appropriate message, and the program returns to a random number generator to produce another sentence. The student had previously been given a choice of how many problems he wishes to work, since practice is more important in this type of exercise than testing.

Some anticipated wrong answers are accounted for by the program. If the student puts the verb in the correct place, but somehow misspells something else in the sentence, he or she receives an appropriate message:

Das Auto kauft Tanta Toni

The verb is correctly placed but
you have a spelling error elsewhere. Try again.

Another possible error at this level is for the student to put the verb in the last position:

Tante Toni das Auto kauft

You have put the verb last.
The person belongs last. try again.

One major disadvantage of using a pool of words in this manner is that the answer cannot be specified in the last 'un' statement, as it can when each problem is being coded separately. Due to the use of the edit function, which replaces any number of strings with a designated string, only the type of word in the student answer can be

recognized. However, the last error message tells the student the rule being violated, asks him to check spelling and try again:

Tanté kauft Toni das Auto

In questions the verb goes f i r s t .
Check your spelling and try again.

Level II works in the same manner as Level I. A typical sentence might be presented as follows:

Tante Toni kauft morgen das Auto

The student is expected, as informed in the instructions, to put either the time element or the direct object in the first position. Thus the two possible correct answers are as follows:

Morgen kauft Tante Toni das Auto

or

Das Auto kauft Tante Toni morgen.

These are relatively straightforward drills and are handled by the program in much the same manner as those at the first level. That is, error messages are returned to the student for various wrong transpositions of the elements of the sentence.

With the interrogative drill, however, the sentence structure is locked into the configuration V-S-ADV-O, and thus an additional error possibility is anticipated by the program. If the student enters:

Kauft Tante Toni das Auto morgen

he is informed that the time element is misplaced.

The addition of the time element, which allows the student an option on which elements to put in the first position, also offers the author the possibility of checking

on the student's activity. Thus by appropriate use of counters and some arithmetic, the spread between choice of first elements is noted, and if it is too large, the student is reminded of the fact,and is given the opportunity to attempt some drills of the other sort.

The third level of the program shows the extent of structures with which Coursewriter is capable of dealing. The problem is presented to the student in the following manner:

Onkel Hermann weiss (nicht),

Tante Toni kauft das Auto (dass)

The student is expected to unite these elements into a single compound sentence.The negator, ('nicht'), is generated at random. Two correct structures exist:

Onkel Hermann weiss, dass Tante Toni das Auto kauft

or

Dass Tante Toni das Auto kauft, weiss Onkel Herm[illegible]r

The possibilities for error, despite the fact that all the words are given to the student correctly spelled, are increased greatly in this type of problem. Nonetheless a fairly systematic evaluation of elements in the student reply is performed by the program and the following errors are diagnosed:

1. Missing Comma
2. Misplaced Comma
3. Main Clause error
4. Subordinate Clause error.

Since the position of the verbs is of greatest importance, it is paid the most attention in diagnosing student errors in these problems. Somewhat less attention is paid to ancillary spelling errors than in the first two levels of the program.

III

Some Technical Aspects

Although much of the program involves relatively straightforward Coursewriter techniques some aspects of it are worth noting. The random generation of sentences is carried out by means of counters which are initialized and loaded with random numbers at a point in the program to which control returns after every correct answer match ('randa'). From randa the program branches to one of several labels in each category of word, and by indirect addressing and the 'br pr' op code combination, to a specific item under the label. A sample of the coding for PERS1 (one of the labels for choosing a person) looks like this:

```
1-0 pr
1-1 br pr(c2)
2-0 pr
2-1 ty ich
2-2 ld 0/c3
2-3 br randv
3-0 pr
3-1 ty du
3-1 ld 1/c
3-3 br randv

etc
```

A random number from 0 to 3 has been previously loaded into c2. Although this method will support seven 'pr' statements, the number of elements to be typed out was split up evenly into two labels, so that generation of the sentences would not be unbalanced. The counter loaded after the 'ty' statement is used to direct the flow of control to the correct verb form for that person. A carriage return is not entered after the word chosen, but is held off until the end of the sentence.

Some economies can be obtained in the random generation of verb forms. In the case of the 'weak' German verbs, that is, verbs whose stem does not change from person to person, a reasonable saving of space and time can be achieved by generating the stem and the ending separately. The coding for the first person of 'bekommen' ('to get') would look something like this:

```
VERB1
        1-0 pr
        1-1 br pr(c4)
        2-0 pr
        2-1 ty bekommEOB
        2-2 ld 0/c3
        2-3 br END1

        . . .

END1
        1-0 pr
        1-1 br pr (c3)
        2-0 pr
        2-1 ty e EOB
        2-2 br randc

        . . .
```

Thus the word 'bekomme' will be generated, followed by a blank. This device cannot be used for all verbs in German, however, since some of the most important, common and most compatible with many direct objects are less regular in their behavior, (notably, 'sehen,' 'to see' and 'haben' 'to have'). In these cases, the entire verb form was simply typed out and the program was branched to it as dictated by the contents of the appropriate counter.

In the case of compound sentences, the first sentence generated has a slightly different composition, being limited to the verbs 'wissen' ('to know'), 'sagen' ('to say'), 'erzaehlen ' ('to tell') and 'hoeren' ('to hear'), followed at a distance by one of three connectives, 'wie' ('how'), 'warum' ('why') or 'dass' ('that'). The negator 'nicht' may appear at the end of the clause, as well. In these cases, control is directed by means of two switches. If both are on, the program generates a sentence as above, and control returns to the random number generator ('randa'). One of the switches is shut off in the process, and a second clause ('Tante Toni kauft ein Auto') is generated. The switch remaining on directs control to the proper answer section.

The main economy, indeed the device which makes it at all possible to monitor the huge number of combinations allowable from this pool of words, is the Ohio State Edit Function.

If the program were to utilize partial answer processing as a means of matching correct answers or diagnosing errors,

the amount of coding needed would obviate any utility the program might otherwise have. For example, just the matching of eight verbs with all of their personal inflections and,let us say all of the possible subjects, would by itself require too much coding to make the matter worth while. The use of the edit function, however, while sacrificing specificity, does make it possible to process an enormous com ination of words with relative ease.

This function, described in detail in the Ohio State CAI publication, allows complex editing of the student answer buffer (buffer 0). It includes shifting case, deletion of specified strings or characters, replacement of strings or characters and replacement of an EOB.The function also offers control over the scanning itself.

For this program the simple replacement feature was most useful. In its 'null' form (no subarguments specified), the edit function works as follows:

```
fn ed/,,/,,,/rst/sta/stb/stc/.....stn
```

Rst, the replacer string, will replace every occurrence of any of the strings specified in the following arguments. The function also has a backup feature which controls the amount of scanning after a match is made; but the final arrangement of the characters in the answer-matching section of this program made it just as easy without this feature.

The function was used in the following manner in this program. Let us take the transformation S-V-O to V-S-O. The coding would be as follows:

A combination of four subjects (a,b,c and d), four verbs and four direct objects can be monitored. Any occurrence of each has been substituted for by an appropriate number. Phrases can be built up, and 'defined' in this manner, omitted elements can be accounted for as wrong answers; the extent of matching of sentence elements is left solely to the imagination of the author.

```
pr
ep
fn ed/,,/,,,/1 /sa /sb /sc /sd
fn ed/,,/,,,/2 /va /vb /vc /vd
```

```
fn ed/,,/,,,/3 /oa /ob /oc /od
ed sp
ca 213
ty goodl (c/r)
br randa
wa 123
ty error message  (c/r)

etc
```

The use of the function in this manner is, however, not without some headaches. If the author is not too careful about the arrangement of material being scanned, some undesired effects can result. Initially, for instance, it was anticipated that an economy similar to that achieved in the generation of verbs could be obtained by scanning for stems on one line and endings on another (e.g.):

```
fn ed/,,/,,,/4 /ich /du /er etc
fn ed/,,/,,,/5 bekomm/verkauf/kauf  etc
fn ed/,,/,,,/6 /e /st /t /en etc
fn ed/,,/,,,/7 /5 6

. . .

ca 47 (i.e., person +verb)
```

However, the function will also pick up any other '-e' or '-en' ending that happens to be in the wrong place, or for that matter, '-mm' not followed by a space. Extremely careful selection of material can circumvent this, but it will in the end limit the size of the pool of words. In German, for instance, '-e' and '-en' are extremely common morphemes, whose use and occurrence are hardly restricted to verbs.

To avoid this, each form was coded and recognized as ending with a space. At a safe point in the program the spaces were edited out.

Although some additional problems were raised by this sort of program, such as the anticipation of a space after the final word, or the finding and evaluation of a comma, these are relatively easy to code around with the proper

function. At this point, a sample of an answer section will be presented with an appropriate explanation for points of interest.

```
pr
ep
ed ch./ch?/ch/
fn ed/,,/,,,/2 /onkel /tante /vetter
     "      /3 /klara /toni /anna /maria
     "      /3 /franz /klaus /willi /alwin
     "      /1 /ich /du /er /sie /josef /wir /ihr
     "      /1 /2 3
     "      /4 /weiss /weisst /wisst /wissen
     "      /4 /hoere /hoerst /hoert /hoeren
     "      /4 /sage /sagst /sagt /sagen
     "      /4 /erzaehle /erzaehlt
     "      /4 /erzaehlst /erzaehlen
     "      /y /x/x
     "      /5 /nicht
     "      /15 /4 y /4 5 y
     "      /6 /dass /wie /warum
     "      /7 /habe /hast /hat /haben /habt
     "      /7 /betrachte /betrachtest
     "      /7 /betrachtet /betrachten
     "      /7 /bekomme /bekommst
     "      /7 /bekommt /bekommen
     "      /7 /verkaufe /verkaufst
     "      /7 /verkauft /verkaufen
     "      /7 /kaufe /kaufst /kauft /kaufen
     "      /7 /hole /holst /holt /holen
     "      /7 /sehe /siehst /sieht /sehen /seht
     "      /7 /finde /findest /findet /finden
     "      /8 /den einen
     "      /9 /die /eine
     "      /10 /das /ein
     "      /11 /ball /wagen /stuhl tisch
     "      /12 /zeitung /kamera /katze /landkarte
     "      /13 /buch /auto /bier /kleid
     "      /14 /8 11 /9 12 /10 13
ed sp
br ansq3/c13,e,1
ca(w) 11561147 115561147 61147y41 61147y415
ty gut! (c/r)
ad 1/c12
br fin/c12,ge,c1
br ran!/s11,1
br rand
wa(1) %6y%
ty you have put the comma after the  (c/r)
```

```
   connective.it goes before it. try again  (c/r)

wa(1) &617&
ty you have put the verb   (c/r)
   the dependent clause  (c/r)
   in its normal position. it  (c/r)
   goes  l a s t  . again.  (c/r)
wa(w) 115& 1155&
ty the main clause is correct, but  (c/r)
   an error is elsewhere. again (c/r).
wa(1) &61147
ty the subordinate clause is correct, (c/r)
   but you have an error elsewhere. (c/r)
   try again (c/r).
wa(w) 416& 4156&
ty the verb in the main clause is   (c/r)
   out of position. again  (c/r)
wa(w) &514 &y541
ty 'nicht' is out of position. it goes at the (c/r)
   end of the main clause. try again.  (c/r)
un check your spelling and try again  (c/r)
```

The section of coding not shown locates the comma and puts a space to its left. Since all words are being matched with spaces after them, the program also puts a space at the end of the line. The OSU function 'only1' is then used to reduce the number of multiple spaces to 1. The coding shown performs the necessary substitutions of numbers for words. The substitutions are for the most part straightforward, with only two instances of phrase definition (nos. 1 and 14). The remainder of the section branches to an answer group for questions on condition, checks the ca's and wa's and does bookkeeping. The sample ca's shown will match correct answers for either clause in the first position, with or without the negator, and clause by clause error possibilities. The amount of diagnosis desired depends only on the amount of work the author wishes to put in at this point.

Although this paper has been dedicated to the application of an edit function to German word order drills, it is by no means limited to such uses. Any drill or diagnostic work dealing with the grammaticality of large numbers of sentence elements can apply this function with reasonable and economical success.

Footnotes

1. I am most indebted to Prof. Carl Helm of CUNY for pointing out the existence of the function, and doing some initial experimentation with it.

2. Although German nouns are written in the text with capitals,as the orthographic convention requires, they are written with lower case intial letters in the program to accomodate TTY's on the system.

3. A translation of the words not used for names is as follows:

PERSONS: I, you (sing.), she, he, we, you (pl.)
VERBS: to get, to buy, to sell, to see
ARTICLES: the (3), a (3)
OBJECTS:ball, car, chair, table
newspaper, map, camera, cat
book, auto, beer, dress
ADVERBS: today, tomorrow, now, always
CONJUNCTION : that, how, why
VERBS: to say, to hear, to know, to narrate
NEGATOR: not

4. Computer Assisted Instruction. The Ohio State University. Columbus, 1973. p.4.3.